User's Guide

NoxaAME for NeuroShell Trader

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Welcome to AME

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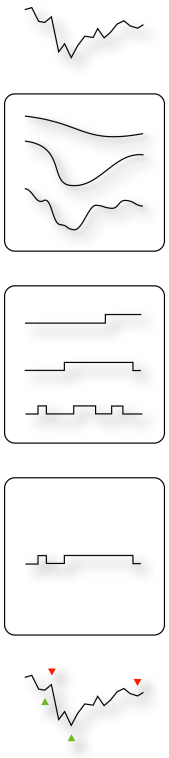
Next-Generation Technology for New markets

Noxa AME (Adaptive Mixture of Experts) is an Expert Advisor that runs as an add-on to Ward System Group's NeuroShell Trader®.



- **Adaptive**: Markets are not static. They are dynamic and susceptible to quick changes, even more so with the influx of High Frequency Trading. Adaptive strategies should be able to adjust to not just changing market conditions, but changes in the fundamental way the market works.
- **Mixture**: Mixtures combine the beliefs of several expert algorithms into a single prediction. They are capable of greater predictive performance than any of their individual experts.
- **Experts**: It is possible for price patterns to develop with different outcomes; they often run contrary to each other. Most often we are pretty useless at making sense of it all. One possible explanation is that we naturally zoom out on the patterns; we don't have a good idea about the details. Expert algorithms however can deconstruct a pattern into low level features and look at how they progress through time in various contextual scenarios.

Welcome to AME

1

Important Notes

- You must have NeuroShell Trader® v6.2 and above to use this product.
- You must have internet access during installation.
- The Expert Advisor does not "peek" into the future, making it suitable for trading.
- This manual is provided to instruct you on using NeuroShell Trader® and the accompanying add-on. It is not a recommendation to buy or sell exchange-traded instruments, but rather a guideline to using the Expert Advisor within the software. The techniques presented here should only be used by investors who are aware of the risk inherent in trading.

Getting started

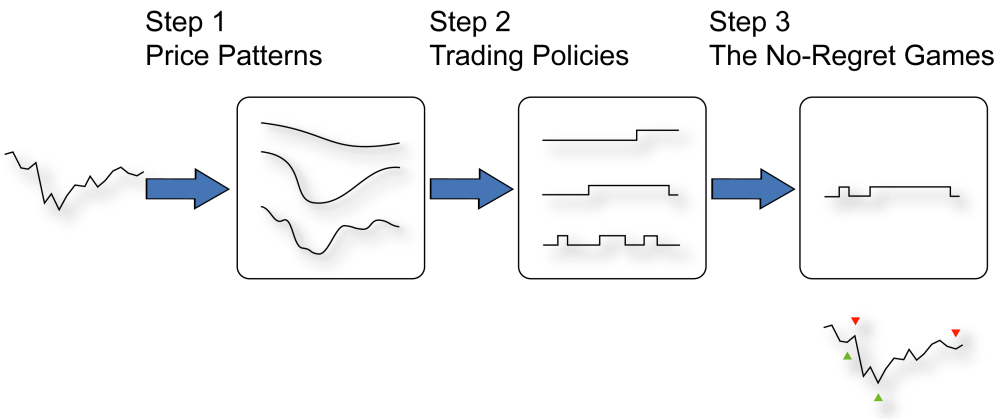
- You can find a gentle description of the product in the Science behind AME section.
- Run through the Quick-Start Tutorials to familiarize yourself with the basics of the Expert Advisor.
- You can jump directly to the Setting the Parameters section.
- There is nothing better than Chart Examples.

The Science behind AME 2

The challenge in making an Expert Advisor like AME lies in developing its ability to:

- Detect price formations,
- Track patterns of behavior as the market changes.

Let see how AME does it:



Step1: Price Patterns

The first thing AME does is parse price data into patterns of various time-scales. During this early stage of the process AME does not know how to trade yet. So it increases its chances by looking at many different options of what the patterns could be.

- Multiple Time-Scales
  Price patterns can be intricate to the point they lead to conflicting interpretations. Fortunately price can be broken at different time-scales into constituent parts that can be better handled separately. At this point, a **Causal Singular Spectrum Analysis** (CSSA) is performed. CSSA recognizes whether price should be decomposed and determines how best to break it down.

Step2: Trading Policies

Of course it's not enough for AME to just identify patterns. It has to know how to exploit them. So it solicits the help of **Expert Algorithms** with different areas of expertise on trading policies. Hundreds of algorithms work in parallel to test each and every one of the patterns identified. At this point quantity trumps accuracy. It is more important for AME to choose from a large number of policies and narrow down from there.

- Adaptive
  The Expert Algorithms are not told what they should do in any particular situation. So they must learn by themselves how the market works. **Reinforcement Learning** is used as the learning method; it is a technique that borrows from biology, where the behavior of an agent adapts on the fly from the amount of positive stimuli, or reinforcement, it receives.

- Risk Adjusted Returns
  The change in Sharpe ratio constitutes the reinforcement signal for the Expert Algorithms; it is a measure of performance versus risk:

  $S_p = change\ of\ (R_p / \sigma)$

  where
  R_p = return
  σ = standard deviation of return also commonly called "volatility risk"

  A low Sharpe ratio indicates either that a trading policy is not getting returns in proportion to the risk involved, or that the risk involved is excessive by any reasonable standard. It is important for the Expert Algorithms to make that distinction so that they properly compensate for the amount of risk undertaken.

Step3: The No-Regret Games

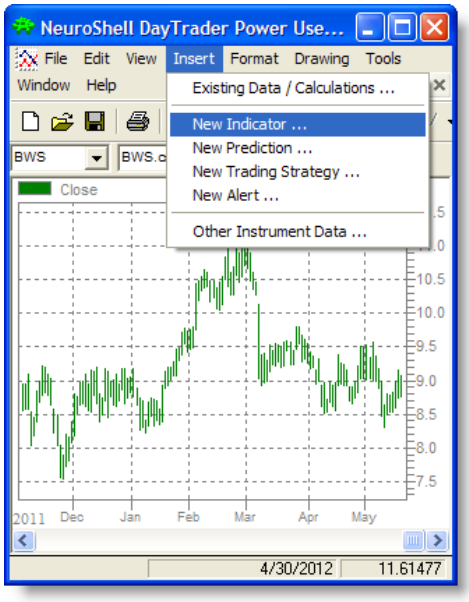
Different trading policies are better than others at different times. AME has to know how to quickly shift emphasis from one policy to another. So just like a person learns from practice, AME puts all policies to work through practice games between the experts and the market. These games are then combined together in such a way that "regret" is minimized to produce the final ratings for the current trade. The term "regret" refers to how sorry we are in retrospect, for not having followed the best system available to us. This way we do well no matter what the market does.

Quick-start Tutorials 3

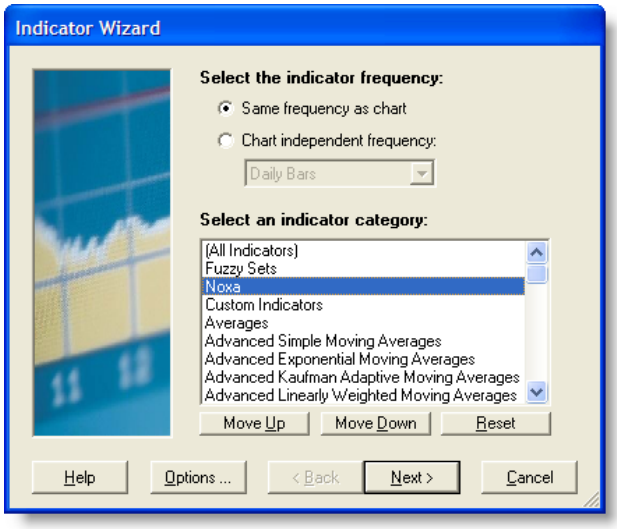
The tutorials in this section provide a quick introduction to using AME. They are intentionally kept brief so that you can start experimenting quickly.

Inserting An Expert Advisor to a chart

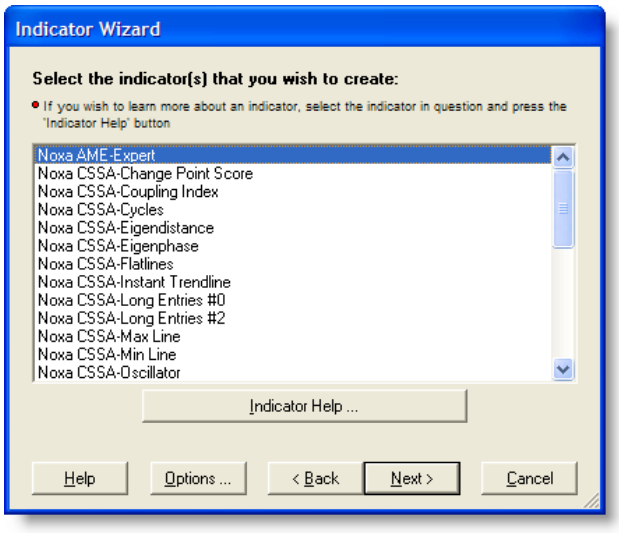
- With a chart open, choose **Insert > New Indicator**:



- The Indicator Wizard opens. Scroll down the list until you see the **Noxa** entry. Click **Next**:



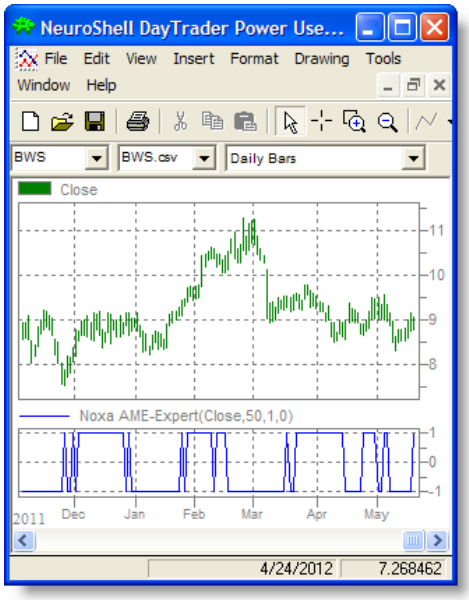
- A list of available indicators is given. Scroll down the list until you see **Noxa AME-Expert**. Click **Next**:



- The indicator property dialog opens. Click **Finished**:

Indicator Wizard - Noxa AME-Expert
To learn more about an indicator and its parameters, select the indicator or one of its parameters and press the 'Indicator Help' button.
More than one indicator will be created if you specify multiple parameters. For example, specifying a moving average size of '5, 10, 20' will create three moving averages.
After an indicator has been added to a chart, you can make changes to it by selecting the indicator with the mouse and choosing 'Modify Indicator' on the 'Edit' menu.
Noxa AME-Expert
Input Series = Close
Window = 50
Output Flag = 1
Negative Flag = 0
Set parameter
Modify parameter
Save Indicator
Indicator Help
Help
Options ...
< Back
Finished
Cancel

- You now have successfully added an Expert Advisor to your chart:



(see chart "AME #1 Inserting an Expert Advisor to your chart.cht").

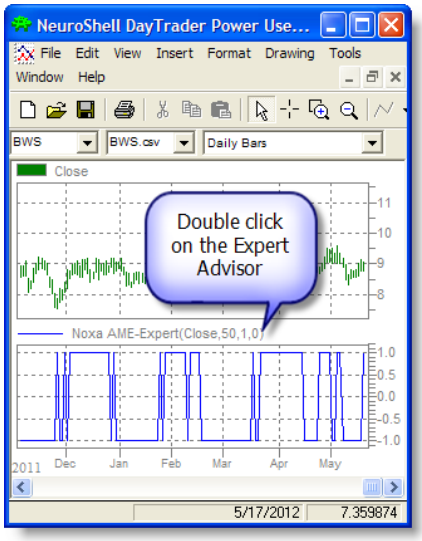
Setting the Output Flag

▼ Inputs description

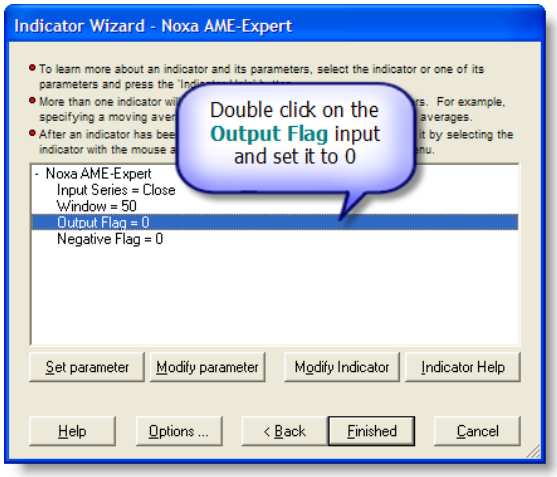
Noxa AME-Expert(Input series, Window, **Output Flag**, Negative Flag)		
Input	**Values**	**Description**
Input Series	OHLC, Adjusted Close Default = Close	Input series
Window	2 ~ 150 bars Default = 50	Rolling time period for the Sharpe ratio calculation
Output Flag	0 or 1 Default = 1	Setting this flag will cause the Advisor to display either the buy/sell signals or the Equity Curve: 1: buy/sell signals 0: Equity Curve
Negative Flag	0 or 1 Default = 0	Setting this flag to 1 will cause the Advisor to trade the opposite rule. This is useful in a trading strategy for which the Advisor has been set to produce a down-trending Equity Curve: 0: signals are left unchanged 1: signals are inverted

Setting the **Output Flag** will cause the Expert Advisor to display either the buy/sell signals or the Equity Curve. By default, it is set to display the buy/sell signals. To display the Equity Curve, set the **Output Flag** to **0** as described below:

- Double click on the title bar of the Expert Advisor:



- The properties dialog box opens. Set the **Output Flag** value to **0**. Click **Finished**:



- The Equity Curve from the Expert Advisor is now displayed:

(see chart "AME #2 Setting the Output Flag.cht").

Note on the Equity Curve

The Equity Curve provides a quick analysis of how an Expert Advisor has performed. It is a graphical representation of the cumulated profit realized at the current bar.

With AME, an Equity Curve with a consistently positive slope, or negative for that matter, indicates that the Expert Advisor is profitable. You can set the Negative Flag to accommodate for the sign of the Equity Curve.

Setting the Window Parameter

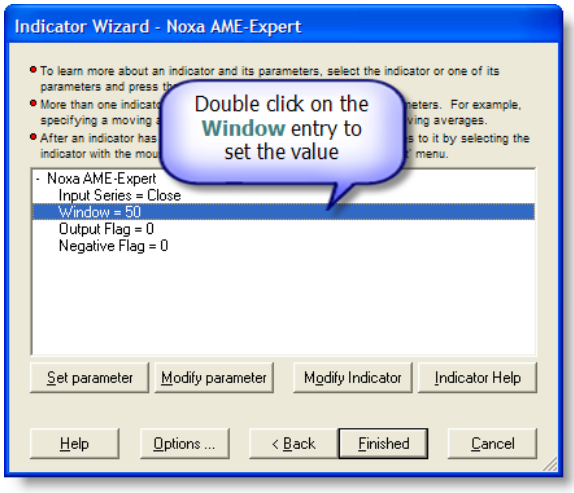
▼ Inputs description

Noxa AME-Expert(Input series, **Window**, Output Flag, Negative Flag)		
Input	**Values**	**Description**
Input Series	OHLC, Adjusted Close Default = Close	Input series
Window	2 ~ 150 bars Default = 50	Rolling time period for the Sharpe ratio calculation
Output Flag	0 or 1 Default = 1	Setting this flag will cause the Advisor to display either the buy/sell signals or the Equity Curve: 1: buy/sell signals 0: Equity Curve
Negative Flag	0 or 1 Default = 0	Setting this flag to 1 will cause the Advisor to trade the opposite rule. This is useful in a trading strategy for which the Advisor has been set to produce a down-trending Equity Curve: 0: signals are left unchanged 1: signals are inverted

The **Window** is a rolling time period that the Expert Algorithms use to calculate their Sharpe ratio from. The Equity Curve obtained by default is probably mediocre. The **Window** size needs to be set to a more optimal value:

- Set the Output Flag to 0 to display the Equity Curve.
- Double click on the title bar of the Expert Advisor:

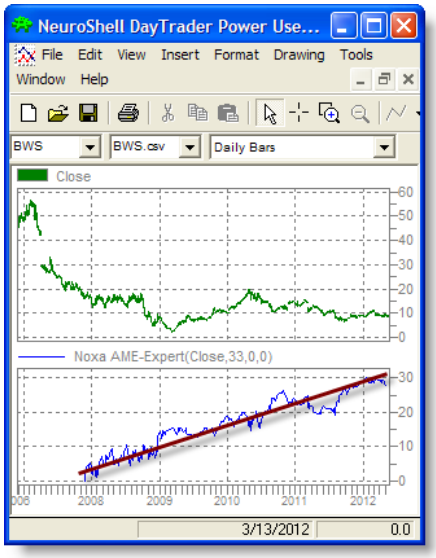
- The properties dialog box opens. Set the **Window** to the value of your choice. Click **Finished**:



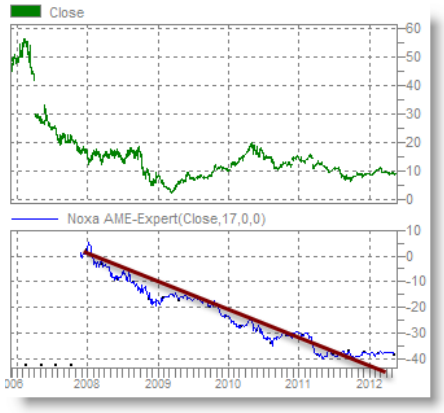
Details on setting the Window parameter

An Equity Curve with a consistently positive or negative slope indicates that the Expert is profitable. Up or down-trending curves are equally valid.

- A typical range for the **Window** size is 2 to 100 bars.
- Set the **Window** size which produces the best up or down-trending Equity Curve as shown below:



Case of an up-trending Equity Curve, Window = 33



Case of a down-trending Equity Curve, Window = 30

(see chart "AME #3 Setting the Window parameter.cht").

Setting the Negative Flag

▼ Inputs description

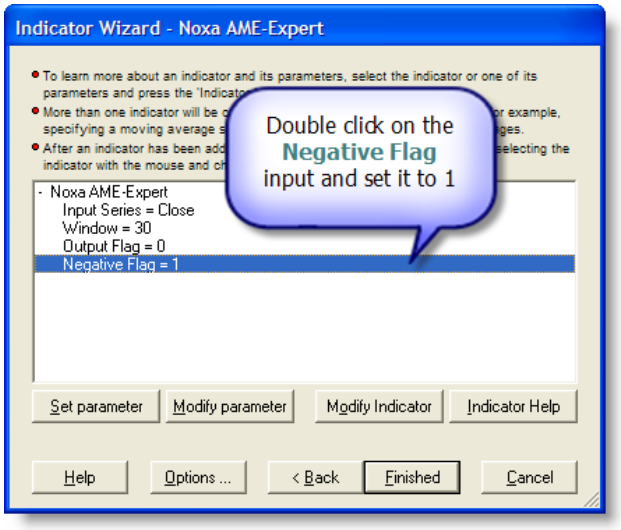
Noxa AME-Expert(Input series, Window, Output Flag, **Negative Flag**)		
Input	**Values**	**Description**
Input Series	OHLC, Adjusted Close Default = Close	Input series
Window	2 ~ 150 bars Default = 50	Rolling time period for the Sharpe ratio calculation
Output Flag	0 or 1 Default = 1	Setting this flag will cause the Advisor to display either the buy/sell signals or the Equity Curve: 1: buy/sell signals 0: Equity Curve
Negative Flag	0 or 1 Default = 0	Setting this flag to 1 will cause the Advisor to trade the opposite rule. This is useful in a trading strategy for which the Advisor has been set to produce a down-trending Equity Curve: 0: signals are left unchanged 1: signals are inverted

This flag can be set to invert the buy/sell signals. This is particularly useful in a trading strategy for which the Expert Advisor has been set to produce a down-trending Equity Curve. In this case you can let NeuroShell Trader set the **Negative Flag** for you. You can read more here on how it is done.

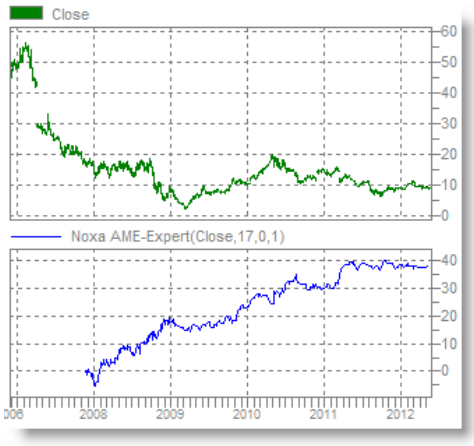
You can also set the **Negative Flag** manually as shown below:

- Double click on the title bar of the Expert Advisor:

- The properties dialog box opens. Set the **Negative Flag** value to **1**. Click **Finished**:



- The Equity Curve for the Expert is now shown inverted:

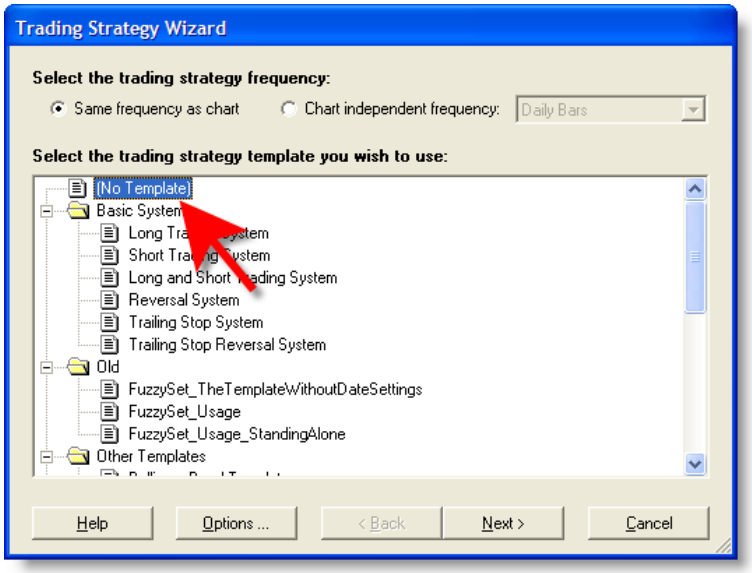


(see chart "AME #4 Setting the Negative Flag.cht").

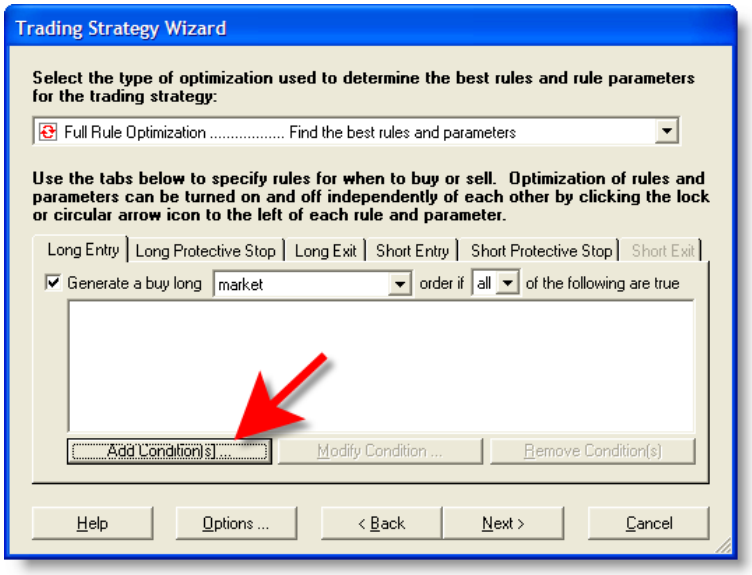
Building a Trading Strategy from scratch

- Insert an Expert Advisor and set the parameters as described in the previous sections. In the example below (iPath S&P 500 VIX MT Futures ETN (VXZ End Of Day)), the Equity Curve of the expert happens to be down-trending:

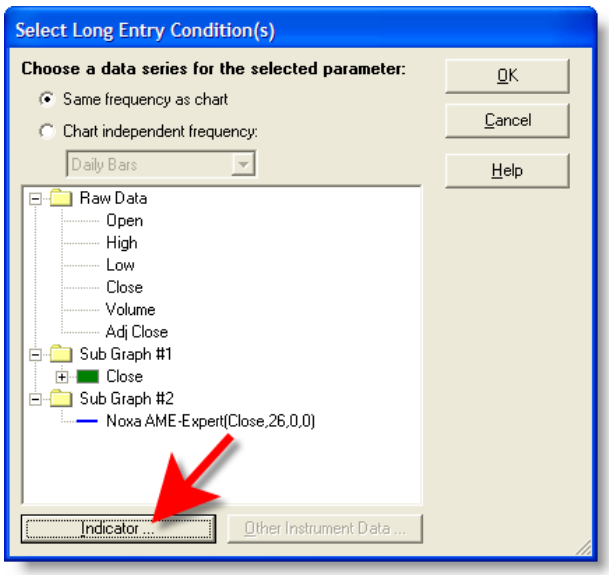
- Select **Insert> New Trading Strategy...** The Trading Strategy Wizard opens with a list of Templates available for use,
- Select **(No Template)** located at the top of the list, click **Next**:



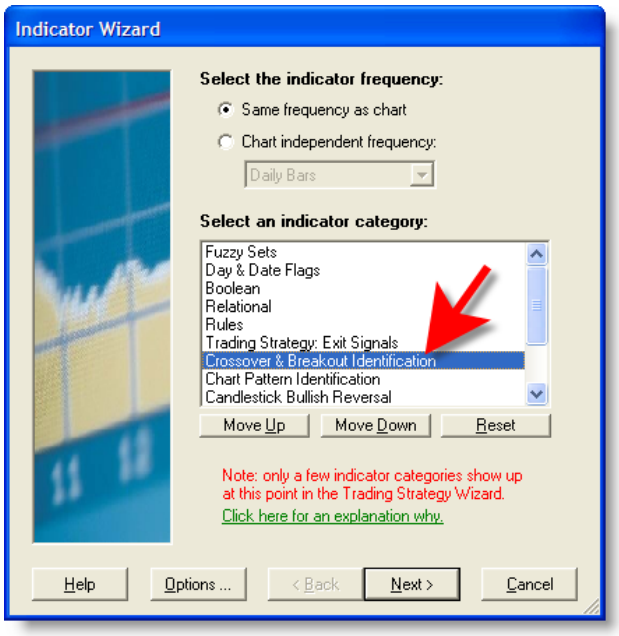
- Select the Long Entry tab to specify the rule for when to buy,
- Press the **Add Condition(s)** button:


Trading Strategy Wizard
Select the type of optimization used to determine the best rules and rule parameters for the trading strategy:
Full Rule Optimization ..... Find the best rules and parameters
Use the tabs below to specify rules for when to buy or sell. Optimization of rules and parameters can be turned on and off independently of each other by clicking the lock or circular arrow icon to the left of each rule and parameter.
Long Entry
Long Protective Stop
Long Exit
Short Entry
Short Protective Stop
Short Exit
Generate a buy long
market
order if
all
of the following are true
Add Condition(s) ...
Modify Condition ...
Remove Condition(s)
Help
Options ...
< Back
Next >
Cancel

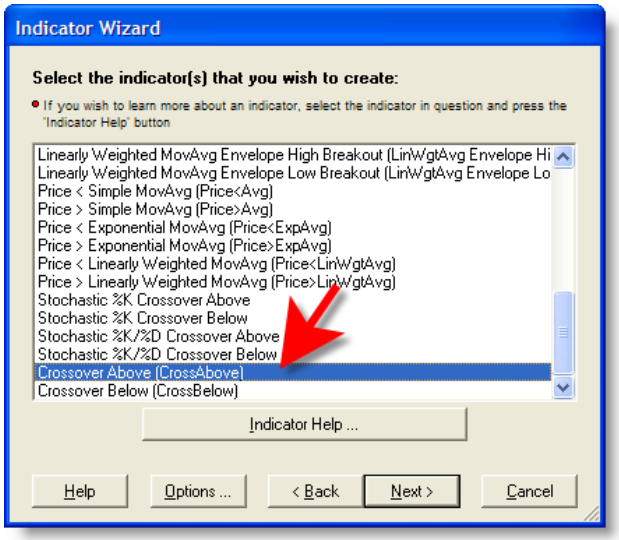
- The Long Entry condition(s) dialog box opens,
- Press the **Indicator...** button:



- The Indicator Category dialog box opens,
- Scroll down the list until you see **Crossover & Breakout Identification.** Click **Next**:



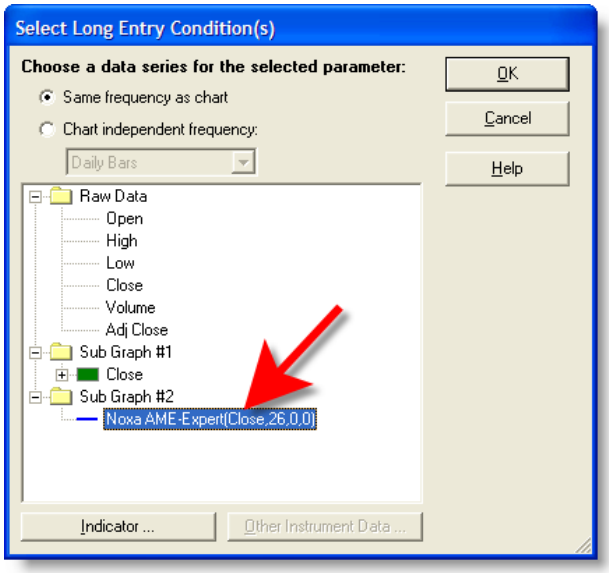
- A full list of available indicators is given.
- Scroll down the list to the **Crossover Above** indicator. Click **Next**:


Indicator Wizard
Select the indicator(s) that you wish to create:
If you wish to learn more about an indicator, select the indicator in question and press the 'Indicator Help' button
Linearly Weighted MovAvg Envelope High Breakout (LinWgtAvg Envelope Hi
Linearly Weighted MovAvg Envelope Low Breakout (LinWgtAvg Envelope Lo
Price < Simple MovAvg (Price<Avg)
Price > Simple MovAvg (Price>Avg)
Price < Exponential MovAvg (Price<ExpAvg)
Price > Exponential MovAvg (Price>ExpAvg)
Price < Linearly Weighted MovAvg (Price<LinWgtAvg)
Price > Linearly Weighted MovAvg (Price>LinWgtAvg)
Stochastic %K Crossover Above
Stochastic %K Crossover Below
Stochastic %K/%D Crossover Above
Stochastic %K/%D Crossover Below
Crossover Above (CrossAbove)
Crossover Below (CrossBelow)
Indicator Help ...
Help
Options ...
< Back
Next >
Cancel

- The wizard for the Crossover Above indicator opens,
- Select (double click) the **Time Series #1** entry:

Indicator Wizard - Crossover Above
To learn more about an indicator and its parameters, select the indicator or one of its parameters and press the 'Indicator Help' button.
More than one indicator will be created if you specify multiple parameters. For example, specifying a moving average size of '5, 10, 20' will create three moving averages.
After an indicator has been added to a chart, you can make changes to it by selecting the indicator with the mouse and choosing 'Modify Indicator' on the 'Edit' menu.
Crossover Above (CrossAbove)
Time Series #1 =
Time Series #2 =
Set parameter
Modify parameter
Save Indicator
Indicator Help
Help
Options ...
< Back
Finished
Cancel

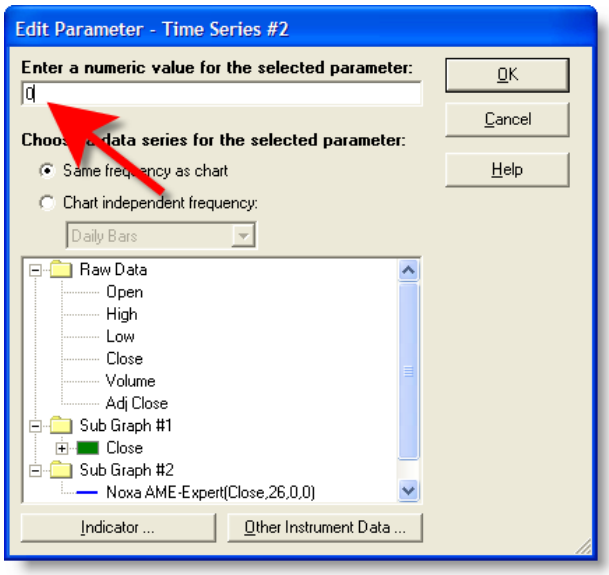
- The Edit Parameter dialog box opens,
- Scroll down the list of data series available until you see the Expert Advisor that was inserted in the chart, Click **OK**:



- You are back to the wizard for the Crossover Above indicator,
- Select (double click) the second input **Time Series #2**:

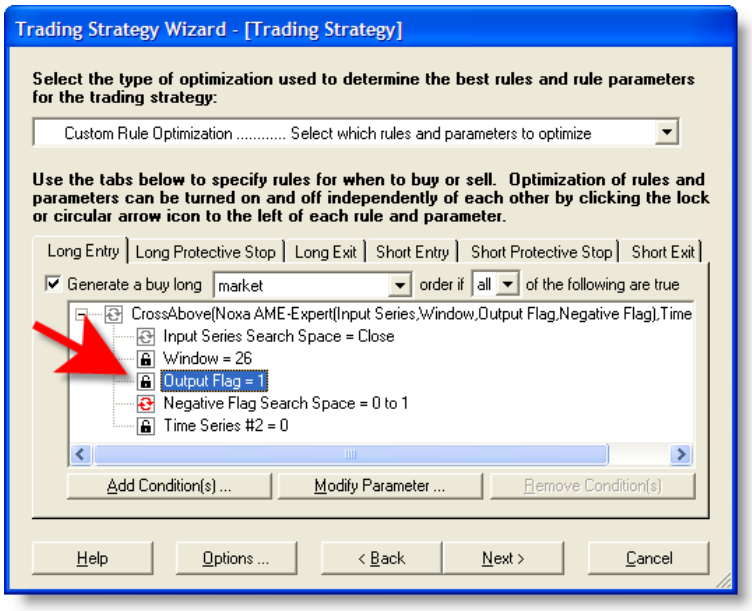
Indicator Wizard - Crossover Above
To learn more about an indicator and its parameters, select the indicator or one of its parameters and press the 'Indicator Help' button.
More than one indicator will be created if you specify multiple parameters. For example, specifying a moving average size of '5, 10, 20' will create three moving averages.
After an indicator has been added to a chart, you can make changes to it by selecting the indicator with the mouse and choosing 'Modify Indicator' on the 'Edit' menu.
Crossover Above (CrossAbove)
Time Series #1 = Noxa AME-Expert(Close,26,0,0)
Time Series #2 =
Set parameter
Modify parameter
Save Indicator
Indicator Help
Help
Options ...
< Back
Finished
Cancel

- Enter the numeric value 0, Click **OK**:

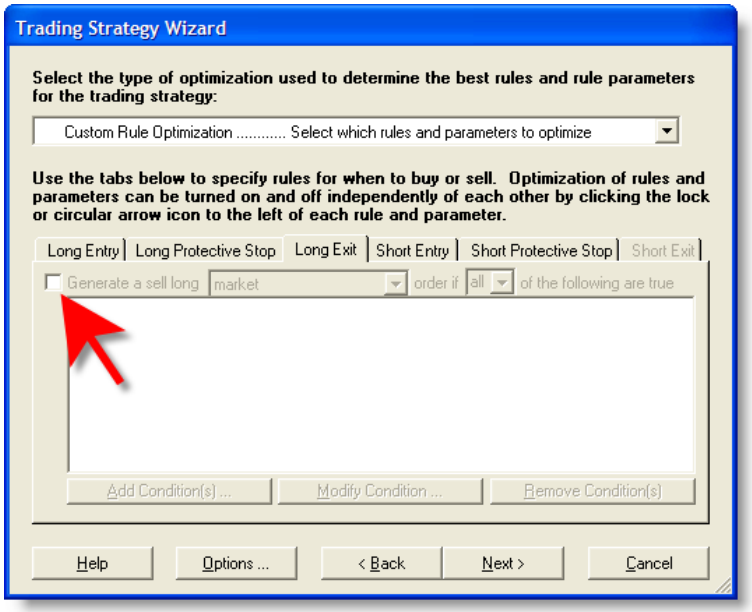


- The long Entry is now set; a buy long order will be placed each time the signal from the Expert Advisor crosses over above the zero line. Click **Finished**.
- Make sure you set the **Output Flag** to **1** so that the Expert displays the buy/sell signals,

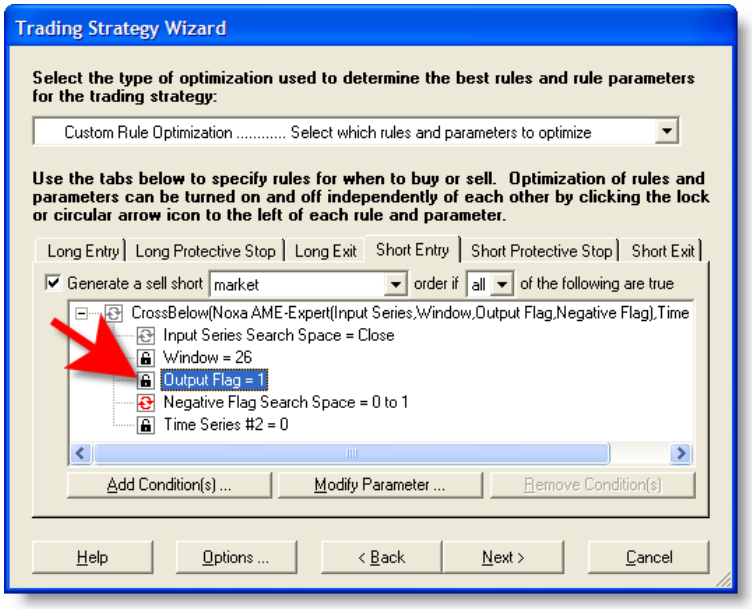
- Set the lock icons located to the left of the inputs so that only the **Negative Flag** is optimized:


Trading Strategy Wizard - [Trading Strategy]
Select the type of optimization used to determine the best rules and rule parameters for the trading strategy:
Custom Rule Optimization ..... Select which rules and parameters to optimize
Use the tabs below to specify rules for when to buy or sell. Optimization of rules and parameters can be turned on and off independently of each other by clicking the lock or circular arrow icon to the left of each rule and parameter.
Long Entry
Long Protective Stop
Long Exit
Short Entry
Short Protective Stop
Short Exit
Generate a buy long
market
order if
all
of the following are true
CrossAbove(Noxa AME-Expert(Input Series,Window,Output Flag,Negative Flag),Time
Input Series Search Space = Close
Window = 26
Output Flag = 1
Negative Flag Search Space = 0 to 1
Time Series #2 = 0
Add Condition(s) ...
Modify Parameter ...
Remove Condition(s)
Help
Options ...
< Back
Next >
Cancel

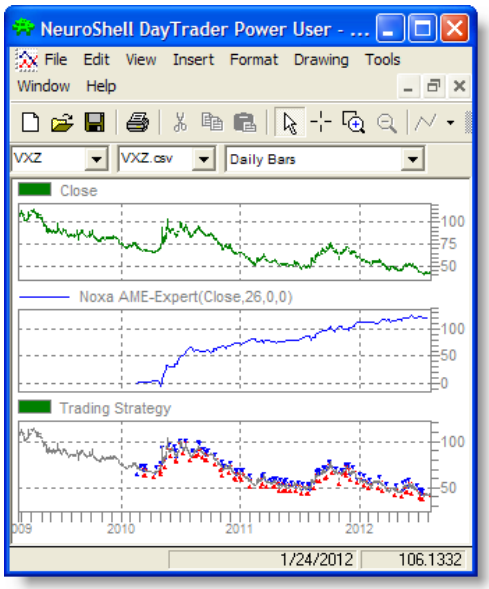
- You don't want to set a Long Exit in this trading strategy. The Long Exit signals will be automatically triggered by the short entries. So, uncheck the "Generate a sell long" check box for the Long Exit as shown below:


Trading Strategy Wizard
Select the type of optimization used to determine the best rules and rule parameters for the trading strategy:
Custom Rule Optimization ..... Select which rules and parameters to optimize
Use the tabs below to specify rules for when to buy or sell. Optimization of rules and parameters can be turned on and off independently of each other by clicking the lock or circular arrow icon to the left of each rule and parameter.
Long Entry
Long Protective Stop
Long Exit
Short Entry
Short Protective Stop
Short Exit
Generate a sell long
market
order if
all
of the following are true
Add Condition(s) ...
Modify Condition ...
Remove Condition(s)
Help
Options ...
< Back
Next >
Cancel

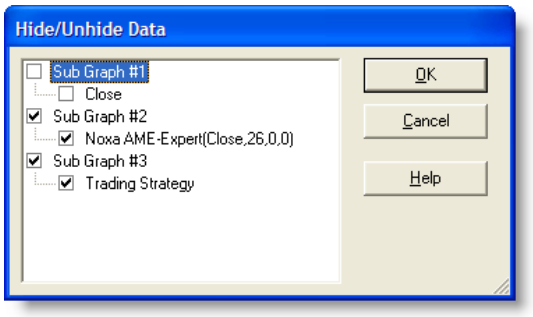
- Repeat the previous steps to set the Short Entry conditions (Short Entry tab). This time, choose and set the **Crossover Below** indicator in order to place a sell short order each time the signal from the Expert Advisor crosses over below the zero line,
- Make sure you set the **Output Flag** to **1** and let only the **Negative Flag** to be optimized,
- Click **Next**:


Trading Strategy Wizard
Select the type of optimization used to determine the best rules and rule parameters for the trading strategy:
Custom Rule Optimization ..... Select which rules and parameters to optimize
Use the tabs below to specify rules for when to buy or sell. Optimization of rules and parameters can be turned on and off independently of each other by clicking the lock or circular arrow icon to the left of each rule and parameter.
Long Entry
Long Protective Stop
Long Exit
Short Entry
Short Protective Stop
Short Exit
Generate a sell short
market
order if
all
of the following are true
CrossBelow(Noxa AME-Expert(Input Series,Window,Output Flag,Negative Flag),Time
Input Series Search Space = Close
Window = 26
Output Flag = 1
Negative Flag Search Space = 0 to 1
Time Series #2 = 0
Add Condition(s) ...
Modify Parameter ...
Remove Condition(s)
Help
Options ...
< Back
Next >
Cancel

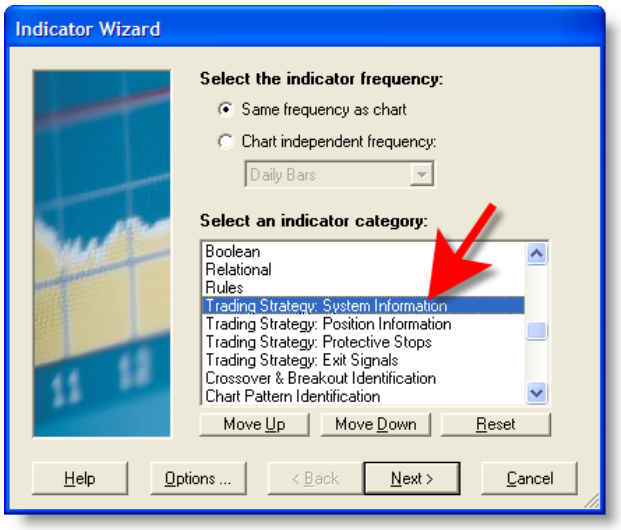
- The trading strategy is now added to your chart:



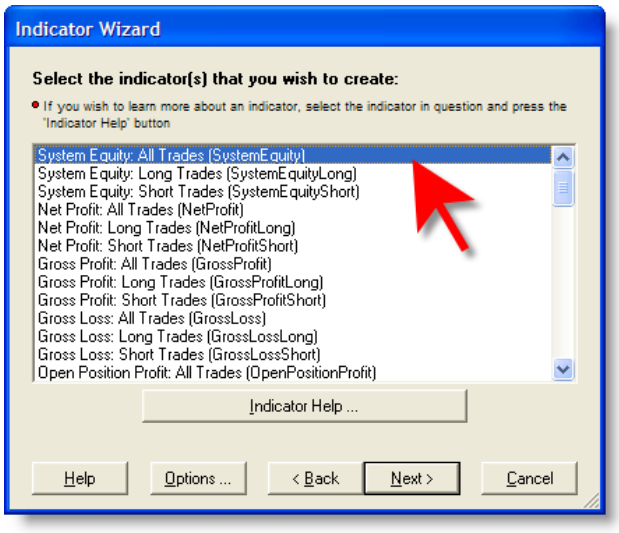
- The "Close" is not needed anymore. To hide it, select **Format> Hide/Unhide Data...**
- Unselect the sub-graph corresponding to the Close and click **OK**:



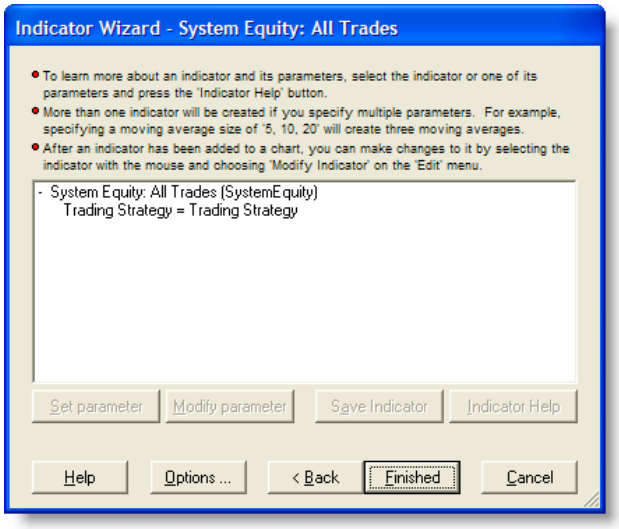
- You can now add the system Equity to your chart; Go to **Insert Menu> new indicator**,
- In the Indicator Wizard, select the **Trading Strategy, System Information** category, click **Next**:



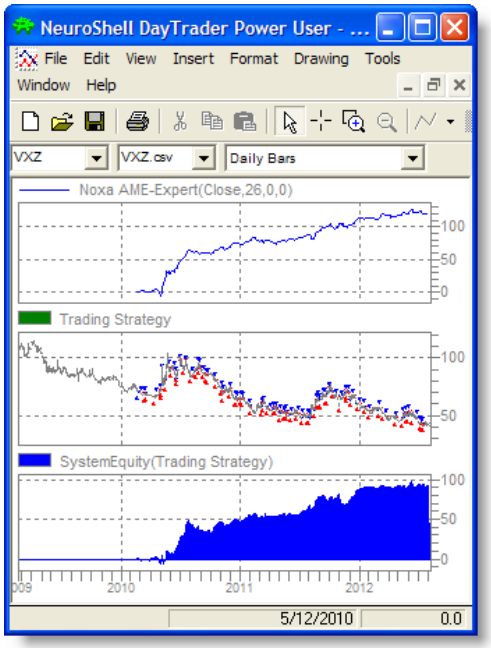
- A list of available indicators is given. Choose the first indicator in the list, **System Equity (All trades)**, click **Next**:


Indicator Wizard
Select the indicator(s) that you wish to create:
If you wish to learn more about an indicator, select the indicator in question and press the 'Indicator Help' button
System Equity: All Trades (SystemEquity)
System Equity: Long Trades (SystemEquityLong)
System Equity: Short Trades (SystemEquityShort)
Net Profit: All Trades (NetProfit)
Net Profit: Long Trades (NetProfitLong)
Net Profit: Short Trades (NetProfitShort)
Gross Profit: All Trades (GrossProfit)
Gross Profit: Long Trades (GrossProfitLong)
Gross Profit: Short Trades (GrossProfitShort)
Gross Loss: All Trades (GrossLoss)
Gross Loss: Long Trades (GrossLossLong)
Gross Loss: Short Trades (GrossLossShort)
Open Position Profit: All Trades (OpenPositionProfit)
Indicator Help ...
Help
Options ...
< Back
Next >
Cancel

- The property dialog box opens. Click **Finished**:


Indicator Wizard - System Equity: All Trades
To learn more about an indicator and its parameters, select the indicator or one of its parameters and press the 'Indicator Help' button.
More than one indicator will be created if you specify multiple parameters. For example, specifying a moving average size of '5, 10, 20' will create three moving averages.
After an indicator has been added to a chart, you can make changes to it by selecting the indicator with the mouse and choosing 'Modify Indicator' on the 'Edit' menu.
System Equity: All Trades (SystemEquity)
Trading Strategy = Trading Strategy
Set parameter
Modify parameter
Save Indicator
Indicator Help
Help
Options ...
< Back
Finished
Cancel

- You now have successfully built a trading strategy:



(see chart "AME #5 Building a Trading Strategy from scratch.cht").

Setting the Parameters 4

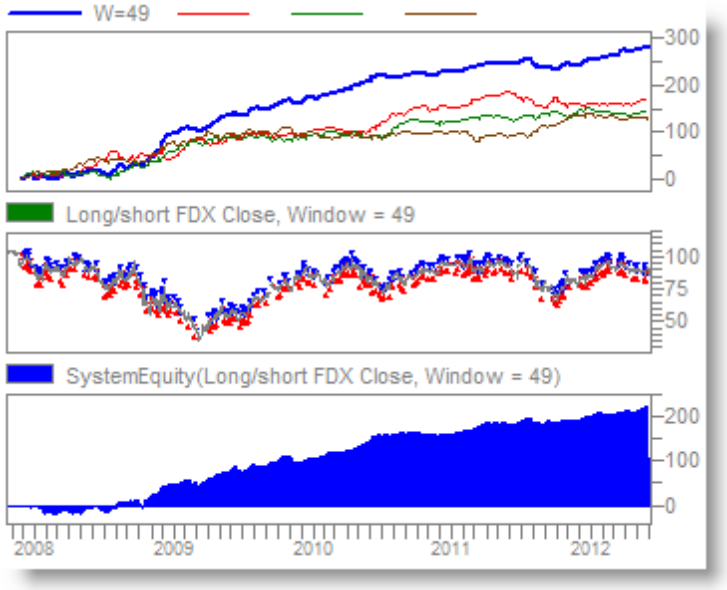
AME is as easy to set as setting up a Moving Average

There is only one parameter to set, the **Window** parameter. The other two entries are just flags. You can read more about setting these flags in the Quick-Start tutorials section.

Noxa AME-Expert(Input series, Window, Output Flag, Negative Flag)		
Input	**Values**	**Description**
Input Series	OHLC, Adjusted Close Default = Close	Input series
Window	2 ~ 150 bars Default = 50	Rolling time period for the Sharpe ratio calculation
Output Flag	0 or 1 Default = 1	Setting this flag will cause the Advisor to display either the buy/sell signals or the Equity Curve: 0: Equity Curve 1: buy/sell signals
Negative Flag	0 or 1 Default = 0	Setting this flag to **1** will cause the Advisor to trade the opposite rule. This is useful in a trading strategy for which the Advisor has been set to produce a down-trending Equity Curve: 0: signals are left unchanged 1: signals are inverted

In some cases, only a few settings stand out, so it is important to go through all values in the 2 to 50 range at least.

To illustrate, the graph below shows some candidates for FedEx Corporation (FDX).



See chart "AME #100 Setting FDX.cht".

AME is easier to set than setting up a Moving Average

Read about "Proxy" trading by timing an index. These strategies are almost parameterless!

Chart Examples 5

We have included several screen shots of example charts with commentary. The charts were reduced to a bare minimum for the sake of clarity. They do not use hindsight or forward reference making them suitable for trading. The returns reported do not account for transaction costs or slippage, but because of how infrequently the models trade and how liquid the instruments traded are, transaction costs and slippage should be minimal assuming a decent sized account.

The charts can be found in the NeuroShell Trader 6\charts\Noxa\Noxa AME folder.

Timing the Volatility Index®

For the uninitiated, the CBOE Volatility Index®, or VIX, is a measure of risk based on the S&P 500. It is an annualized number that represents what traders think the movements in the S&P 500 are going to be in the near term. For example, a reading of 50 means that 50 /12 = 4.2% is about the range traders are anticipating the S&P 500 to trade in over the next 30-day period.

The Rationale

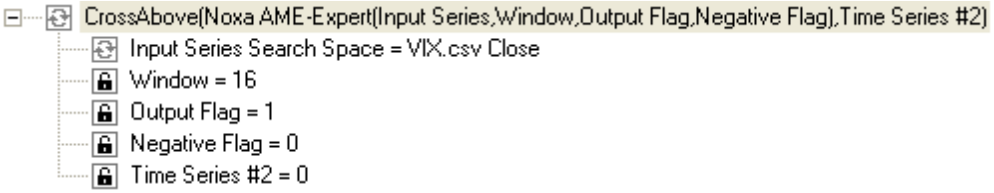
- The VIX forms mean-reverting patterns that are highly predictable,
- The VIX index can't be traded directly but there are Exchange-Traded Products or ETPs available that are designed to track the VIX and that can be traded throughout the day just like a stock,
- The VIX and ETPs are so well correlated that what works on one works on the other.

The Strategy

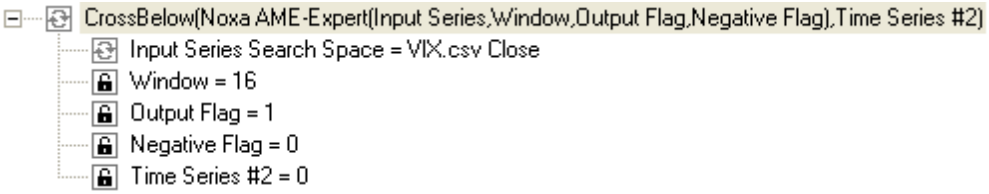
Take short-term positions (long/short) in S&P 500 ETPs by timing the VIX.

Buy/short at the next open when AME applied to the VIX crosses above or below the zero line:

- Buy long:


CrossAbove(Noxa AME-Expert(Input Series,Window,Output Flag,Negative Flag),Time Series #2)
Input Series Search Space = VIX.csv Close
Window = 16
Output Flag = 1
Negative Flag = 0
Time Series #2 = 0

- Sell short:

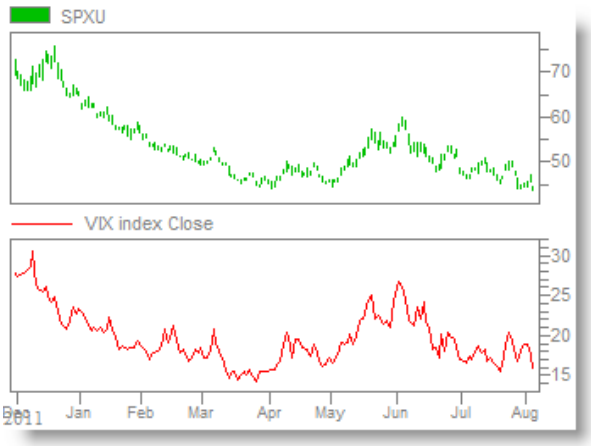

CrossBelow(Noxa AME-Expert(Input Series,Window,Output Flag,Negative Flag),Time Series #2)
Input Series Search Space = VIX.csv Close
Window = 16
Output Flag = 1
Negative Flag = 0
Time Series #2 = 0

Note three things:

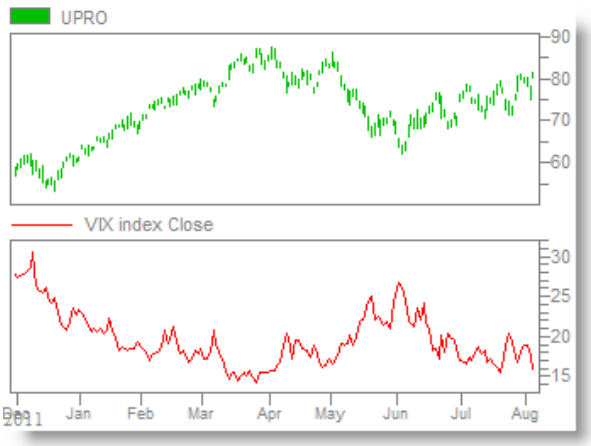
- The Input Series is set to the VIX meaning that the buy/sell signals are obtained from the VIX itself as opposed to the instrument being traded.
- The **Window** parameter has been set to **16** during a **Calibration** step. A description of this step is given later in this section.
- The Negative Flag has to be set to 0 or 1 whether there is positive or negative correlation between the instrument being traded and the VIX.

▼ See illustration

Case of a positive correlation: set Negative Flag to 0



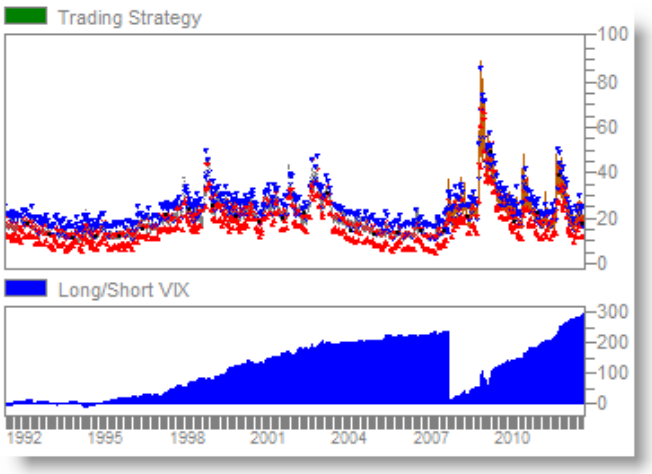
Case of a negative correlation: set Negative Flag to 1



Note the strong correlation between the ETPs and the index.

The calibration step

The Window parameter is set during this calibration step.



In the graph above we have assumed we could buy/short the VIX index at the next open when AME crosses above or below the zero line. As you can see in the bottom panel, this strategy would have put up impressive numbers: an hypothetical 66.5% profitable trades with about 1 trade per week over the entire 5-year test period (see chart "AME #300 Timing the VIX index.cht").

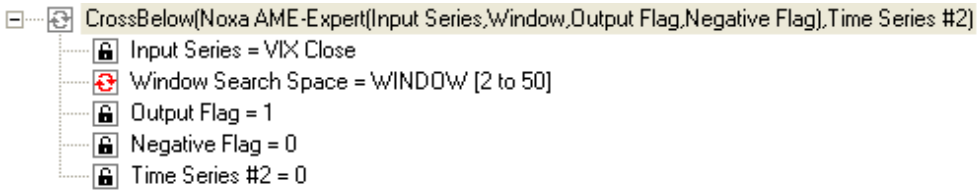
▼ See details

The entry rules

- Buy long:

CrossAbove(Noxa AME-Expert(Input Series,Window,Output Flag,Negative Flag),Time Series #2)
Input Series = VIX Close
Window Search Space = WINDOW [2 to 50]
Output Flag = 1
Negative Flag = 0
Time Series #2 = 0

- Sell short:


CrossBelow(Noxa AME-Expert(Input Series,Window,Output Flag,Negative Flag),Time Series #2)
Input Series = VIX Close
Window Search Space = WINDOW [2 to 50]
Output Flag = 1
Negative Flag = 0
Time Series #2 = 0

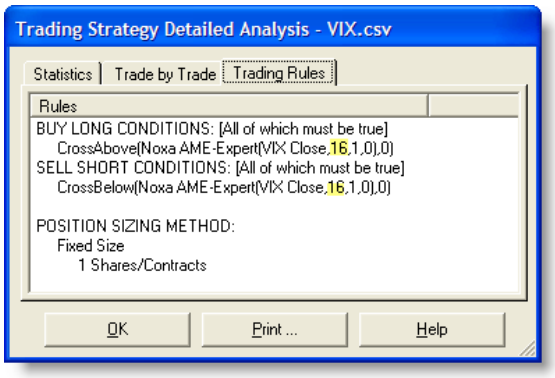
Note that the Window parameter is set to optimize to the same value for both the long and short rules.

Paper Trading

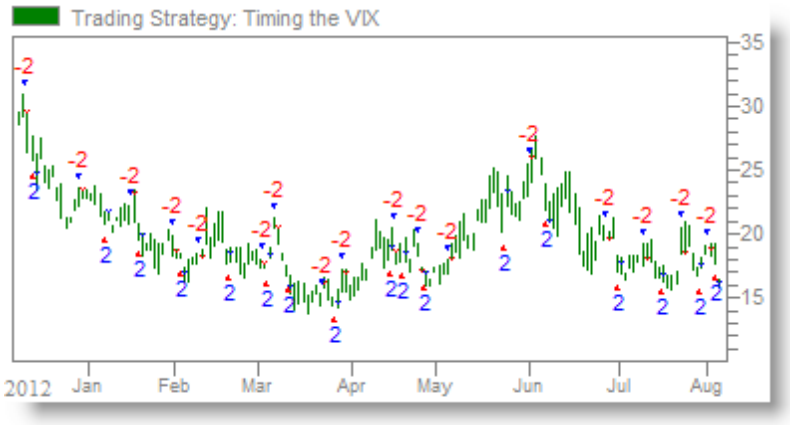
- Five years of data are hold out for testing purpose
- The return on Trades is maximized

Results

- The optimized value for the Window parameter can be found in the Trading Strategy Analysis wizard under the "Trading Rules" tab as shown below:



- Zooming in on the buy/sell signals:



- Detailed Analysis (averaged out over 5 years paper trading):

	Long & Short	Short only	Long only
Annual Return	209%	118.7%	90.3%
% Profitable Trades	66.5%	62.4%	70.7%
Average Trade Span	5 bars	6 bars	5 bars

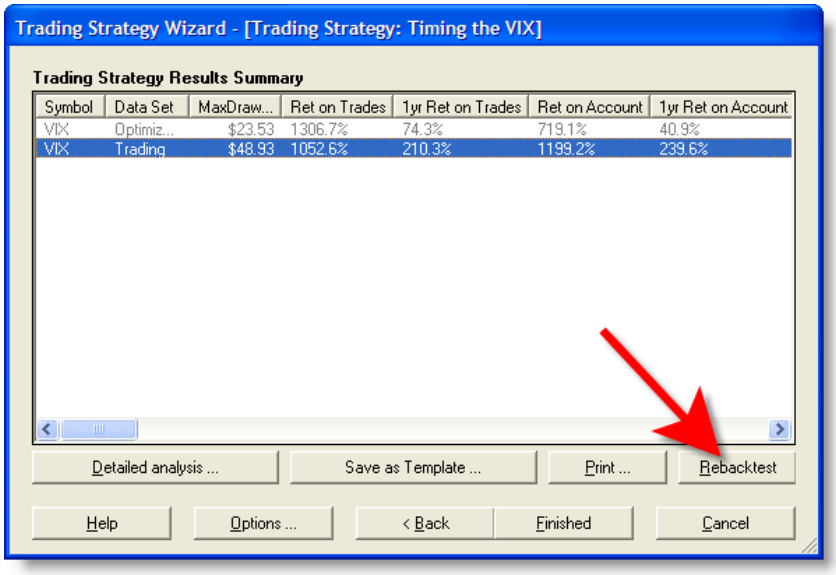
Maintenance

Maintenance should be minimal. **Window = 16** has been a good value since 1994; AME was able to produce consistent returns over the entire 5-year test period and did an excellent job at sidestepping the 2008 bear market. More importantly, AME handled well the VIX new formulation that took place in 2003, so we expect it to persist.

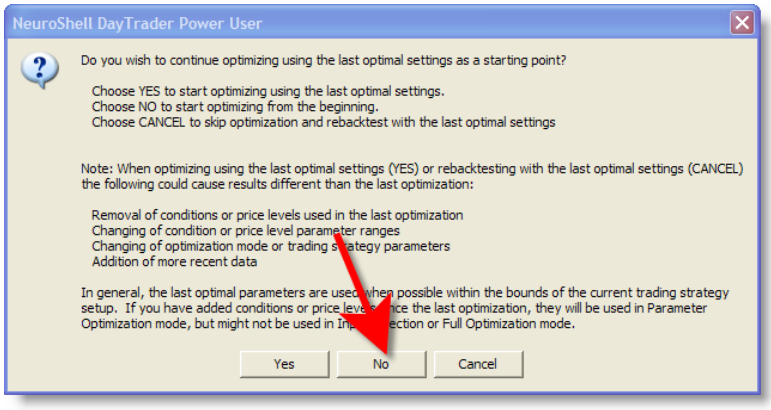
However it is a good idea to check once in a while how the system equity curve behaves. Ultimately, if it starts leveling out, you will need to recalibrate. Then you will have to reset the Window to its new value in the trading rules.

- See details

  You can recalibrate by simply re-optimizing the chart "AME #300 Timing the VIX index.cht":



  In the next window that opens, click **No** to start optimizing from the beginning:

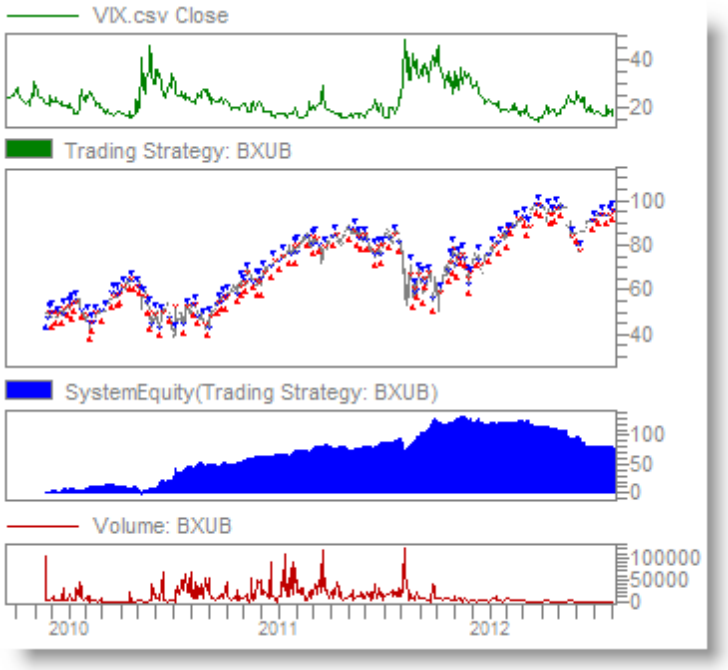

NeuroShell DayTrader Power User
Do you wish to continue optimizing using the last optimal settings as a starting point?
Choose YES to start optimizing using the last optimal settings.
Choose NO to start optimizing from the beginning.
Choose CANCEL to skip optimization and rebacktest with the last optimal settings
Note: When optimizing using the last optimal settings (YES) or rebacktesting with the last optimal settings (CANCEL) the following could cause results different than the last optimization:
Removal of conditions or price levels used in the last optimization
Changing of condition or price level parameter ranges
Changing of optimization mode or trading strategy parameters
Addition of more recent data
In general, the last optimal parameters are used when possible within the bounds of the current trading strategy setup. If you have added conditions or price levels since the last optimization, they will be used in Parameter Optimization mode, but might not be used in Incremental Selection or Full Optimization mode.
Yes
No
Cancel

Get away from thinly traded ETPs

The success of the strategy depends on the ability of the ETPs to track the index. However, when the ETP becomes illiquid for example, it looses it's ability to correctly track the VIX.

- See illustration

  To illustrate, here is a chart of Barclays Long B Leveraged S&P 500 TR ETN (BXUB). As you can see in the bottom panel, the trading volume dropped sharply end of 2011, so did the equity curve.



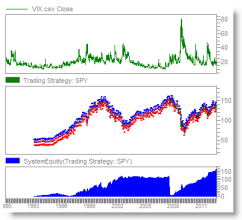
See chart "AME #320 BXUB from VIX.cht".

Chart Examples 5

Equity ETFs

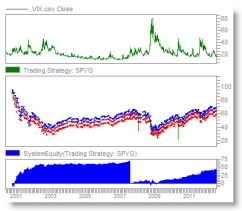
An *Exchange Traded Fund*, also known as an ETF, is a security that tracks an asset or an index by holding the actual components of the index. One of the most widely known ETFs tracks the S&P500 index and trades under the symbol SPY. In recent years, ETFs have grown in popularity. ETFs appeal to investors mostly because they offer all the diversification of an index fund and can be traded just like a stock throughout the trading day.

SPDR S&P 500 (SPY)
AME $301 SPY from VIX.cht



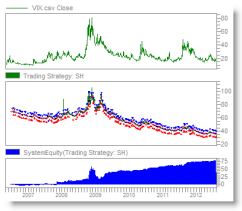
	Long & Short	Long only	Short only
Annual Return	28.8%	15.1%	13.8%
% Profitable Trades	63.3%	69.3%	57.1%

SPDR S&P 500 Growth ETF (SPYG)
AME #302 SPYG from VIX.cht



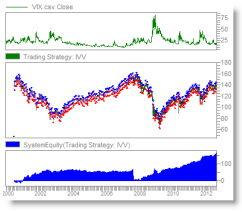
	Long & Short	Long only	Short only
Annual Return	18.5%	11.8%	6.7%
% Profitable Trades	62.6%	67.9%	57.4%

ProShares Short S&P 500 (SH)
AME #303 SH from VIX.cht



	Long & Short	Long only	Short only
Annual Return	27.3%	9.4%	17.8%
% Profitable Trades	62.3%	55.3%	69.3%

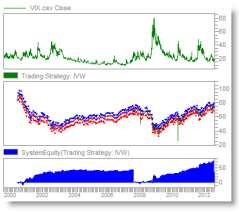
iShares S&P 500 Index (IVV)
AME #304 IVV from VIX.cht



	Long & Short	Long only	Short only
Annual Return	28.8%	15.1%	13.7%
% Profitable Trades	63%	68.7%	57.4%

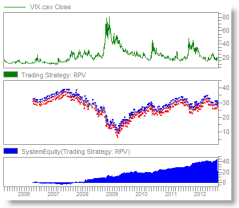
Chart Examples

iShares S&P 500 Growth Index (IVW)
AME #305 IVW from VIX.cht



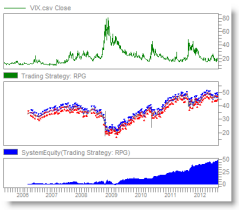
	Long & Short	Long only	Short only
Annual Return	26.6%	15.5%	11.1%
% Profitable Trades	64.4%	69.3%	59.6%

Guggenheim S&P 500 Pure Value (RPV)
AME #306 RPV from VIX.cht



	Long & Short	Long only	Short only
Annual Return	29.4%	16.5%	12.9%
% Profitable Trades	55.8%	60.7%	50.9%

Guggenheim S&P500 Pure Growth (RPG)
AME #307 RPG from VIX.cht



	Long & Short	Long only	Short only
Annual Return	21%	14.2%	6.8%
% Profitable Trades	60.6%	65.5%	55.8%

Chart Examples 5

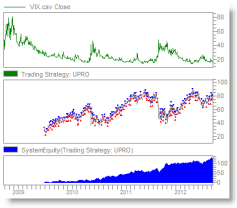
Leveraged Equity ETFs

These ETFs usually come with the name "Ultra" and if you look into their descriptions they seek to generate a return that is a multiple of the index's performance. The ProShares Ultra S&P500 (SSO) for example is an ETF designed to return twice the S&P 500. It does it not by actually borrowing money, but by using a combination of derivatives. However, the effect is the same, and if the S&P 500 returns 1%, the SSO should return about 2%.

ProShares Ultra S&P500 (SSO)
AME #308 SSO from VIX.cht

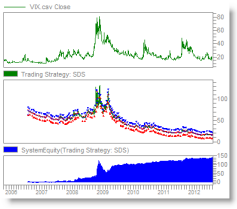
	Long & Short	Long only	Short only
Annual Return	52.4%	26.7%	25.7%
% Profitable Trades	62.3%	67.9%	56.7%

ProShares UltraPro S&P500 (UPRO)
AME #309 UPRO adjusted from VIX.cht



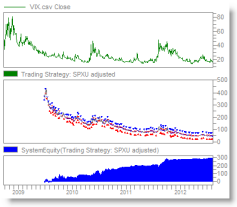
	Long & Short	Long only	Short only
Annual Return	71.6%	58.9%	12.7%
% Profitable Trades	65.3%	75.6%	55.2%

ProShares UltraShort S&P500 (SDS)
AME #310 SDS from VIX.cht



	Long & Short	Long only	Short only
Annual Return	57%	19.9%	37.1%
% Profitable Trades	63.7%	56%	71.4%

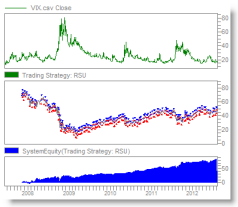
ProShares UltraPro Short S&P500 (SPXU)
AME #311 SPXU adjusted from VIX.cht



	Long & Short	Long only	Short only
Annual Return	73.3%	8.3%	65.1%
% Profitable Trades	64.7%	50.6%	79.1%

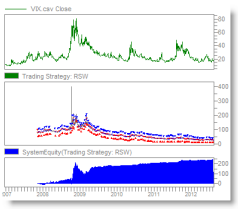
Chart Examples

Guggenheim 2x S&P 500 (RSU)
AME #312 RSU from VIX.cht



	Long & Short	Long only	Short only
Annual Return	50.8%	26.2%	24.6%
% Profitable Trades	64.1%	67.9%	60.3%

Guggenheim Inverse 2x S&P 500 (RSW)
AME #313 RSW from VIX.cht

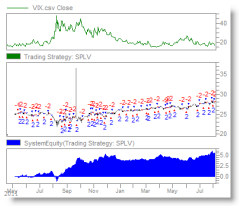


	Long & Short	Long only	Short only
Annual Return	60.8%	23.4%	37.4%
% Profitable Trades	64.1%	58.8%	69.5%

Low Volatility ETFs

Low volatity ETFs are portfolios that are invested in the steadiest stocks. The PowerShares S&P 500 Low Volatility Portfolio (SPLV), targets the 100 components of the S&P 500 with the lowest historical volatility.

PowerShares S&P 500 Low Volatility (SPLV)
AME #314 SPLV from VIX.cht



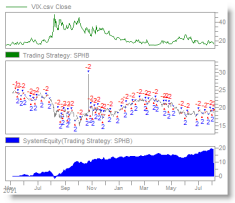
	Long & Short	Long only	Short only
Annual Return	22.5%	17.1%	5.4%
% Profitable Trades	67.6%	74.3%	61.1%

Chart Examples 5

High Beta ETFs

High Beta ETFs target high beta stocks. Higher beta means greater sensitivity to broad movements in equity markets, meaning that the ETFs are expected to include a significant shift towards volatile stocks.

PowerShares S&P 500 High Beta (SPHB)
AME #315 SPHB from VIX.cht

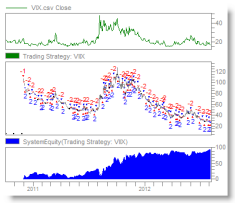


	Long & Short	Long only	Short only
Annual Return	83%	35.6%	47.4%
% Profitable Trades	74.6%	77.1%	72.2%

Volatility ETNs

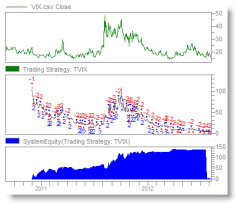
Exchange-traded notes (ETNs) are debt securities by which the issuer promises to pay a return based on the index's performance. They trade throughout the day like a stock. Today, ETNs have become popular investment tools for investors who are trying to get exposure to the returns of specific asset classes that could not be set up in an Exchange Traded Fund (ETF).

VelocityShares Long VIX ST ETN (VIIX)
AME #316 VIIX from VIX.cht



	Long & Short	Long only	Short only
Annual Return	81.3%	11.7%	69.5%
% Profitable Trades	63.3%	51.1%	75.6%

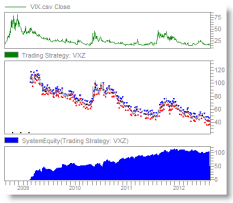
VelocityShares Daily 2x VIX ST ETN (TVIX)
AME #317 TVIX from VIX.cht



	Long & Short	Long only	Short only
Annual Return	218.3 %	50.1%	168.2 %
% Profitable Trades	65.6%	53.3%	77.8%

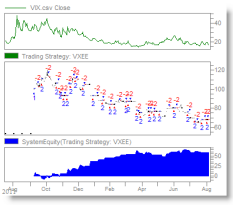
Chart Examples

iPath S&P 500 VIX MT Futures ETN (VXZ)
AME #318 VXZ from VIX.cht



	Long & Short	Long only	Short only
Annual Return	36.3%	7.1%	29.2%
% Profitable Trades	59.7%	53.5%	66%

UBS E-TRACS 5Mo S&P 500 VIX Futures ETN (VXEE)
AME #319 VXEE from VIX.cht



	Long & Short	Long only	Short only
Annual Return	65.1%	13.7%	51.3%
% Profitable Trades	44%	40%	48%

Chart Examples 5

Timing the S&P 500 index®

The S&P 500 (^GSPC) is an index of 500 leading stocks chosen to reflect the risk/return characteristics of the large-cap US equities market.

The Rationale

- Indexes such as the S&P 500 are groups of similar stocks that represent a particular segment of the market. The similarities make returns more predictable and stable than the constituent stocks taken individually,
- There are Exchange-Traded Products or ETPs available that track the index well and that can be traded just like a stock.
- The S&P 500 and ETPs are so well correlated that what works on one works on the other.

The Strategy

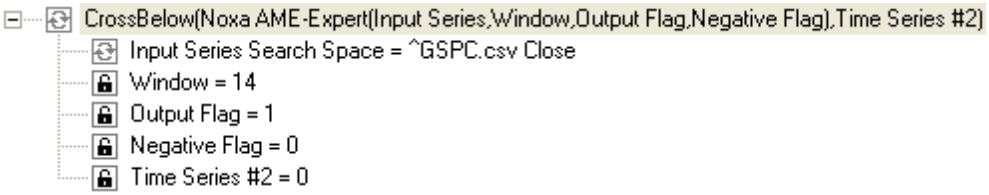
Take short-term positions (long/short) in S&P 500 ETPs by timing the S&P 500 index.

Buy/short at the next open when AME applied to ^GSPC crosses above or below the zero line:

- Buy long:

CrossAbove(Noxa AME-Expert(Input Series,Window,Output Flag,Negative Flag),Time Series #2)
Input Series Search Space = ^GSPC.csv Close
Window = 14
Output Flag = 1
Negative Flag = 0
Time Series #2 = 0

- Sell short:

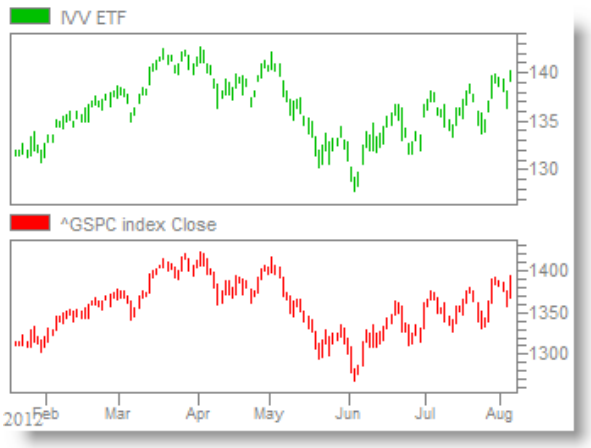

CrossBelow(Noxa AME-Expert(Input Series,Window,Output Flag,Negative Flag),Time Series #2)
Input Series Search Space = ^GSPC.csv Close
Window = 14
Output Flag = 1
Negative Flag = 0
Time Series #2 = 0

Note three things:

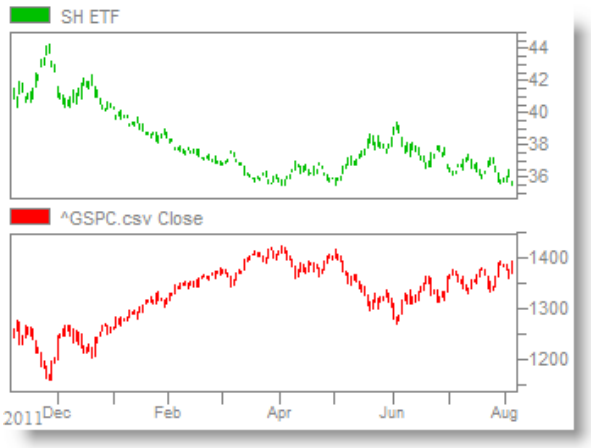
- The Input Series is set to the ^GSPC meaning that the buy/sell signals are obtained from the S&P 500 index itself as opposed to the instrument being traded.
- The **Window** parameter has been set to **14** during a **Calibration** step. A description of this step is given later in this section.
- The Negative Flag has to be set to 0 or 1 whether there is positive or negative correlation between the instrument being traded and the index.

▼ See illustration

Case of a positive correlation: set Negative Flag to 0

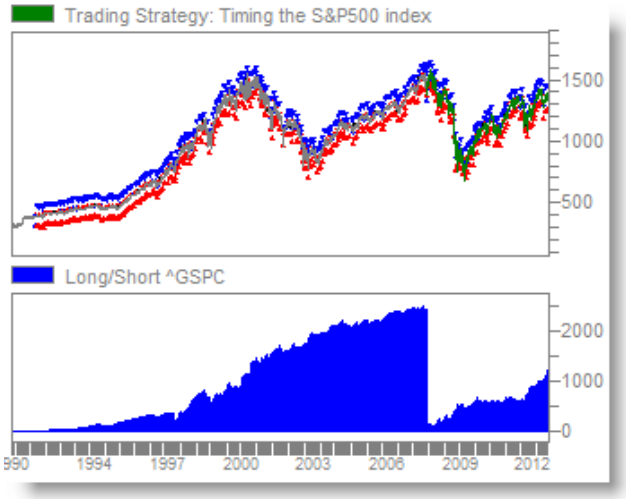


Case of a negative correlation: set Negative Flag to 1



The calibration step

The Window parameter is set during this calibration step.



In the graph above we have assumed we could buy/short ^GSPC index at the next open when AME crosses above or below the zero line. This strategy would have put up good numbers: an hypothetical 59.8% profitable trades with less than 1 trade per week over the entire 5-year test period (see chart "AME #400 Timing the S&P500 index.cht").

▼ See details

The entry rules

- Buy long:

CrossAbove(Noxa AME-Expert(Input Series,Window,Output Flag,Negative Flag),Time Series #2)
- Input Series = Close
- Window Search Space = WINDOW [2 to 50]
- Output Flag = 1
- Negative Flag Search Space = NEGATIVE FLAG [0 to 1]
- Time Series #2 = 0

- Sell short:

CrossBelow(Noxa AME-Expert(Input Series,Window,Output Flag,Negative Flag),Time Series #2)
- Input Series = Close
- Window Search Space = WINDOW [2 to 50]
- Output Flag = 1
- Negative Flag Search Space = NEGATIVE FLAG [0 to 1]
- Time Series #2 = 0

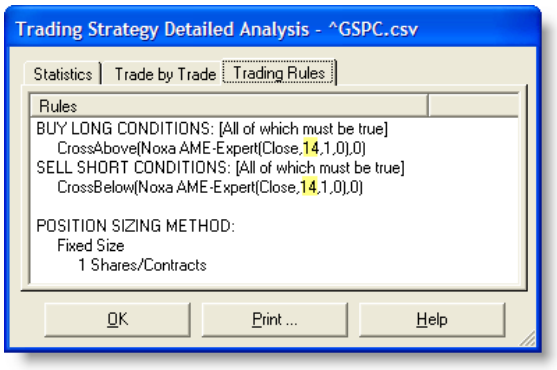
Note that the parameters are set to optimize to the same values for both the long and short rules.

Paper trading

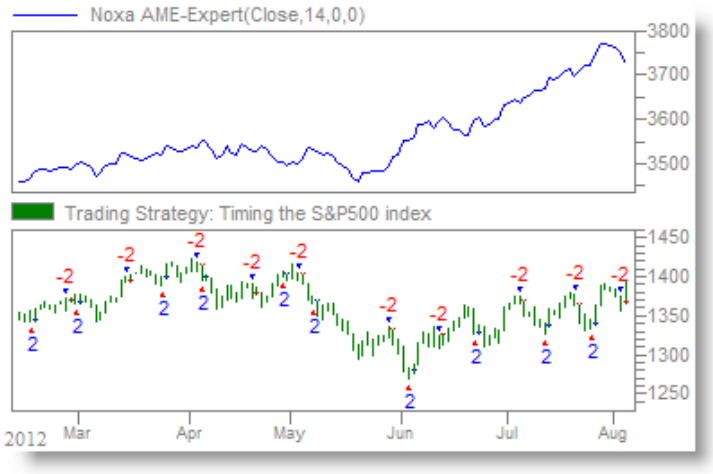
- Five years of data are hold out for testing purpose:
- Net Profit is maximized:

Results

- The optimized value for the Window parameter can be found in the Trading Strategy Analysis wizard under the "Trading Rules" tab as shown below:



- Zooming in on the buy/sell signals:



- Detailed Analysis (averaged out over 5 years out-of-sample):

	Long & Short	Long only	Short only
Annual Return	21.8%	11.3%	10.5%
% Profitable Trades	59.8%	66.3%	53.3%
Average Trade Span	8 bars	10 bars	6 bars

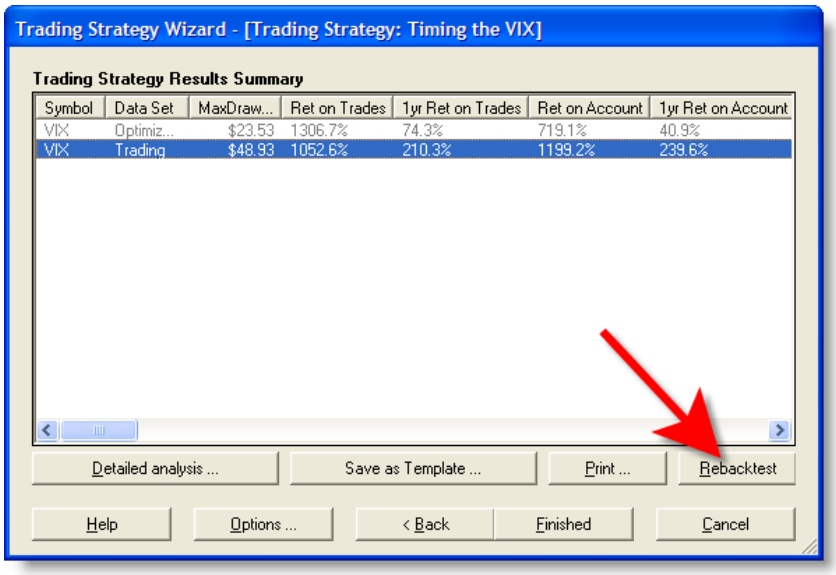
Maintenance

Maintenance should be minimal. **Window = 14** has been a good value since 1992; AME was able to produce consistent returns over the entire 5-year test period and fared well during times of real market stress, like 2008. We expect it to continue moving forward.

However it is a good idea to check once in a while how the equity curve behaves. Ultimately, if it starts leveling out, you will need to recalibrate. Then you will have to reset the Window to its new value in the trading rules.

- See details

  You can recalibrate by simply re-optimizing the chart "AME #400 Timing the S&P500 index.cht":



  In the next window that opens, click **No** to start optimizing from the beginning:

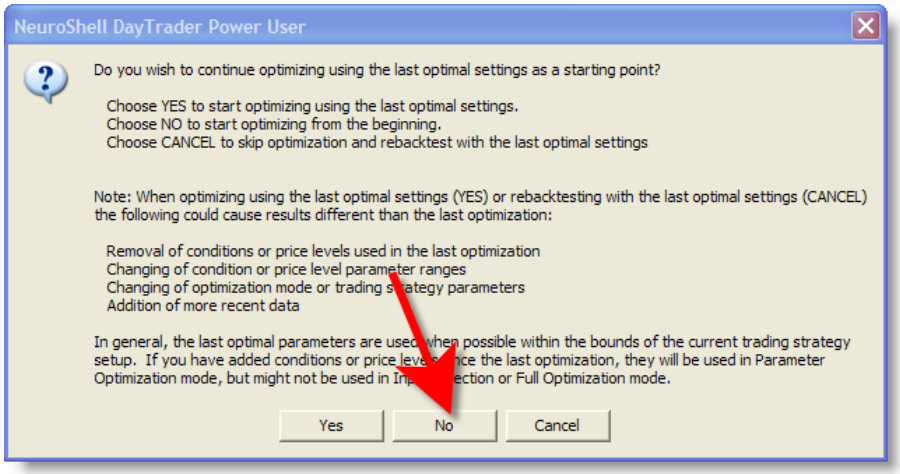

NeuroShell DayTrader Power User
Do you wish to continue optimizing using the last optimal settings as a starting point?
Choose YES to start optimizing using the last optimal settings.
Choose NO to start optimizing from the beginning.
Choose CANCEL to skip optimization and rebacktest with the last optimal settings
Note: When optimizing using the last optimal settings (YES) or rebacktesting with the last optimal settings (CANCEL) the following could cause results different than the last optimization:
Removal of conditions or price levels used in the last optimization
Changing of condition or price level parameter ranges
Changing of optimization mode or trading strategy parameters
Addition of more recent data
In general, the last optimal parameters are used when possible within the bounds of the current trading strategy setup. If you have added conditions or price levels since the last optimization, they will be used in Parameter Optimization mode, but might not be used in Insp ection or Full Optimization mode.
Yes
No
Cancel

Chart Examples

5

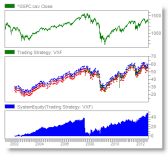
Equity ETFs

An *Exchange Traded Fund*, also known as an ETF, is a security that tracks an asset or an index by holding the actual components of the index. One of the most widely known ETFs tracks the S&P500 index and trades under the symbol SPY. In recent years, ETFs have grown in popularity. ETFs appeal to investors mostly because they offer all the diversification of an index fund and can be traded just like a stock throughout the trading day.

SPDR S&P 500 (SPY)
AME #401 SPY from
^GSPC.cht

	Long & Short	Long only	Short only
Annual Return	16%	8.5%	7.5%
% Profitable Trades	57.5%	64%	51.1%

Vanguard Extended Market Index ETF (VXF)
AME #402 VXF from
^GSPC.cht



	Long & Short	Long only	Short only
Annual Return	23.6%	14.6%	9%
% Profitable Trades	55.9%	59.6%	52.2%

iShares S&P 500 Index (IVV)
AME #403 IVV from
^GSPC.cht

	Long & Short	Long only	Short only
Annual Return	14.5%	7.8%	6.7%
% Profitable Trades	57%	62.9%	61.1%

Getting Help

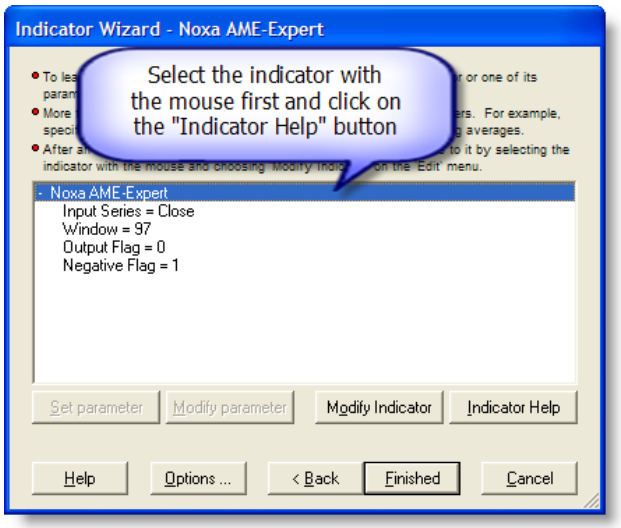
6

The first place to check if you run into a challenge or question is in this Help file. We have tried to provide every answer in this pages you will need to operate Noxa-AME.

Displaying the Help

- The quickest way to display the Help is to select the indicator and press **F1**:

- You can also have access to the Help from the Indicator Wizard; select the indicator with the mouse and click on the Help button:



Getting Help

6

Contacting Noxa Support

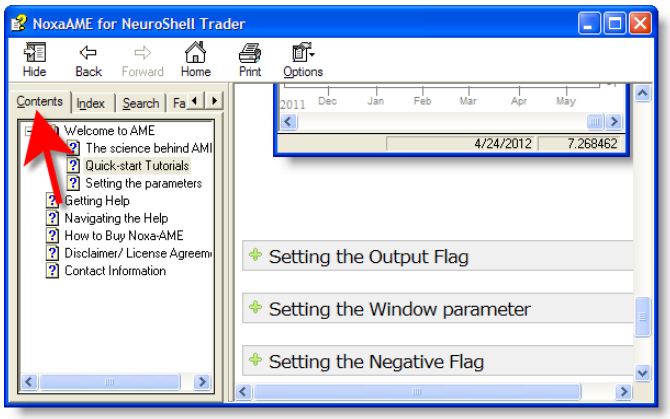
If you find that you need more help, you can contact Noxa's technical support via email at: info@noxapredict.com

Navigating the Help 7

The method you choose depends on how you prefer getting information. You may feel more comfortable using the Contents and the Index pages in the Help dialog or Finding pages yourself.

Contents

- The Contents page is organized very similarly to a Table of Contents in a book. But instead of turning the pages to reach the desired subject, simply double-click on the topics:

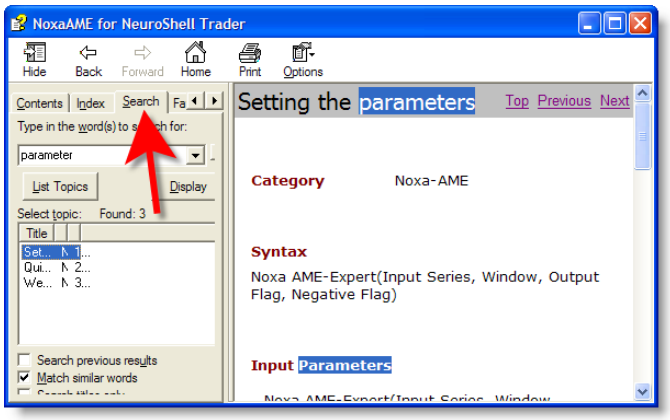


Index

- The Index page is used to search for help on a specific topic by typing the first few letters of the topic you are looking for. For example, suppose you want to find out how to set a parameter value. If you type the word "parameter" in the edit box, the index entry list will quickly display the keywords beginning with "parameter".
- Double-click an entry to display the corresponding help page:

Search

- The Find page is used to search for every occurrence of a word or phrase within the help topics. This search is more extensive yet less selective than using the Index page. For example, suppose you want to find every occurrence of the word "expert" within the help topics. If you type the word "expert" in the edit box, every help topic containing the word "expert" will appear in the list, and will be highlighted in the topic:



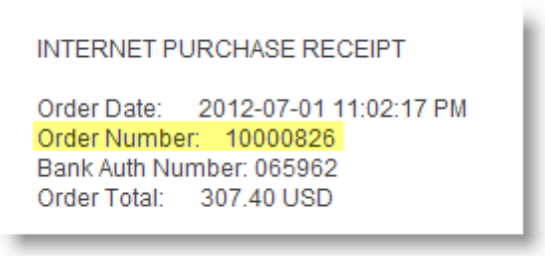
Activating Noxa-AME 8

You must activate Noxa-AME on your computer before using it. Activation is also required before you swap, change, reformat, or reconfigure your hard drive.

Here is how you do it in three easy steps...

Write down your Purchase Order Number

- You can locate this number in the confirmation e-mail that has been sent to you after you purchased the product. It is an 8-digit number next to the "Order Number" entry as shown below:

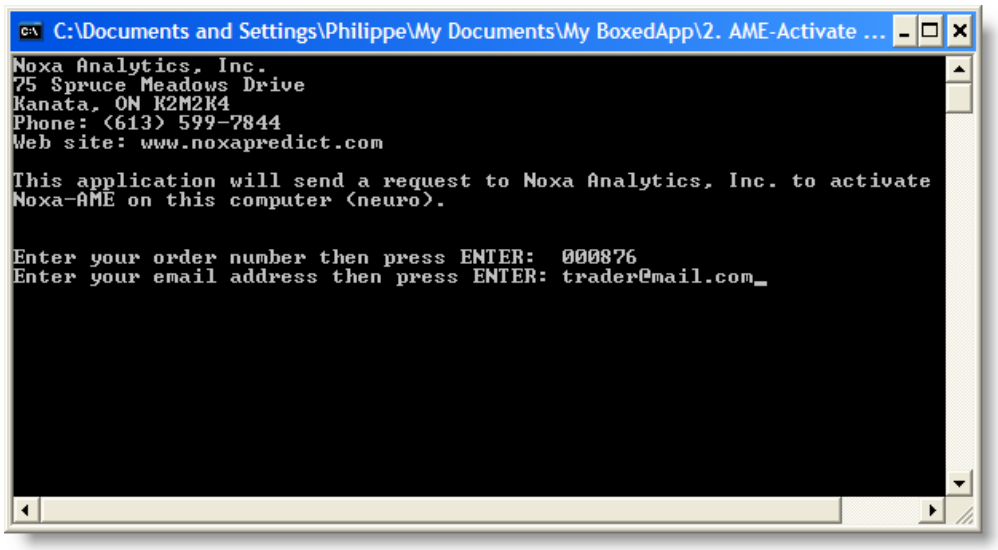


- If you are unable to identify this number, please contact Noxa support at info@noxapredict.com

Run Noxa-AME Activate.exe

- Click the Start Menu icon in the lower left hand corner of your screen. Then click on the All Programs menu.
- In the menu listing that appears, look for the folder named Noxa\Noxa AME. Then click the Noxa-AME Activate.exe program.

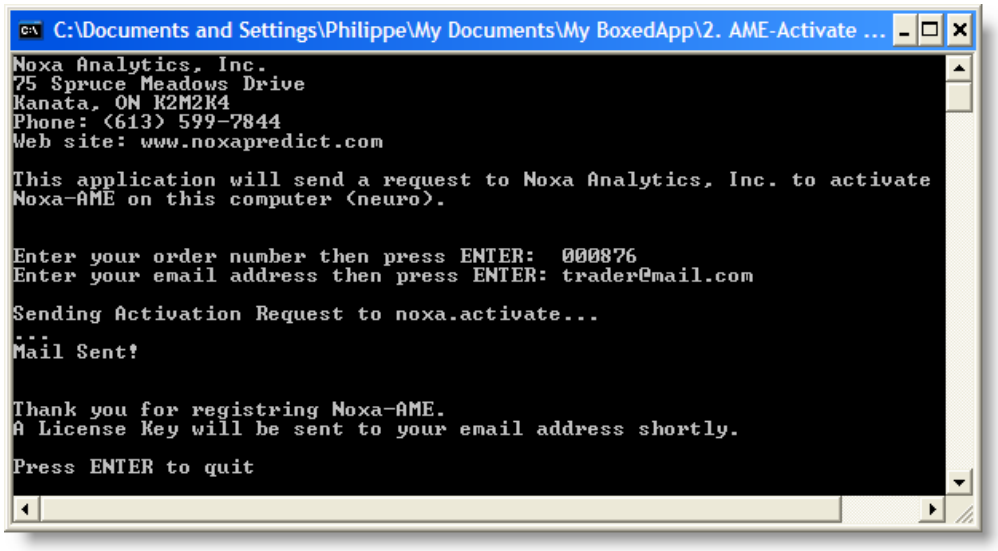
- When the activation process begins, Noxa-AME Activate.exe tries to detect an Internet connection. If one is found, your request will be automatically sent to a license server. You will be asked to enter the following information:
  - Your order number,
  - Your email address:


C:\Documents and Settings\Philippe\My Documents\My BoxedApp\2. AME-Activate ...
Noxa Analytics, Inc.
75 Spruce Meadows Drive
Kanata, ON K2M2K4
Phone: (613) 599-7844
Web site: www.noxapredict.com
This application will send a request to Noxa Analytics, Inc. to activate
Noxa-AME on this computer (neuro).
Enter your order number then press ENTER: 000876
Enter your email address then press ENTER: trader@mail.com

- When finished, you should read the following lines:

" Thank you for registering Noxa-AME.
A License Key will be sent to your email address shortly.

Press Enter to Quit "


C:\Documents and Settings\Philippe\My Documents\My BoxedApp\2. AME-Activate ...
Noxa Analytics, Inc.
75 Spruce Meadows Drive
Kanata, ON K2M2K4
Phone: (613) 599-7844
Web site: www.noxapredict.com
This application will send a request to Noxa Analytics, Inc. to activate
Noxa-AME on this computer (neuro).
Enter your order number then press ENTER: 000876
Enter your email address then press ENTER: trader@mail.com
Sending Activation Request to noxa.activate...
...
Mail Sent!
Thank you for registring Noxa-AME.
A License Key will be sent to your email address shortly.
Press ENTER to quit

Activating Noxa-AME 8

Copy the License Key to your System

- Check your email; you should have received a confirmation email with the license key attached,
- Detach the NoxaAMELicenseKey.dat file,
- Save the file to the C:\NeuroShell Trader 6\Noxa folder.
- Congratulations! Your Noxa-AME package is now permanently activated on your computer.

Any Problem with the Activation?

- You get the following error message: "Application failed in sending request (error# 104)!" This issue occurs because Noxa-AME Activate.exe did not find a working internet connection.
- Resolution:
  - Verify that your Internet connection is functional and try again,
  - Ultimately you could send us your request by email at info@noxapredict.com with your Activation Request Key attached (NoxaAMEActivationRequest_000xxx.dat). You can find this file in the C:\NeuroShell Trader 6\Noxa\Noxa AME directory.
- Any other problem with the activation process? Contact our Support Team at info@noxapredict.com and we'll be glad to help you out.

How to Buy Noxa-AME

9

You can buy Noxa-AME directly online worldwide with your credit card. As soon as your transaction is completed you will be able to download and install the add-on right away.

Direct order link

Buy License

Disclaimer/ License Agreement 10

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